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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,976	02/20/2002	Min-Cheol Oh	016631-024	2286
21836	7590	11/06/2003	EXAMINER	
HENRICKS SLAVIN AND HOLMES LLP			LEE, JOHN D	
SUITE 200			ART UNIT	
840 APOLLO STREET			PAPER NUMBER	
EL SEGUNDO, CA 90245			2874	

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/081,976

Applicant(s)

OH ET AL

Examiner

Daniel E Valencia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on telephonic election on July 29, 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 2-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,9-18 and 20 is/are rejected.
- 7) ☒ Claim(s) 19 and 21 is/are objected to.
- 8) ☒ Claim(s) 1-21 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- ☒ Interview Summary (PTO-413) Paper No(s). 4.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other:

DETAILED ACTION

Applicant's election without traverse of Group I (claims 1 and 9-21) in telephonic interview on July 29, 2003 is acknowledged. Accordingly, claims 2-8 are withdrawn from consideration.

Inventorship

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1, 9, 10, 12, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saini U.S. Patent No. 6,310,995. Refer to the appropriate drawings or parts of the specification. Saini discloses a resonantly coupled waveguide using a taper with essentially all the limitations of the claimed invention. Regarding claims 1 and 9, Saini discloses a waveguide structure (fig. 5 and 7A) and method, comprising an electrooptic (EO) polymer waveguide (52, 82, col. 7, line 45); a passive polymer waveguide (54, 46); and a tapered EO polymer waveguide interconnection structure ("Mode Transformation Section", 72, 50, 40) between the EO polymer waveguide and the passive polymer waveguide. Saini repeatedly refers to a mode that is transferred and transformed between sections (col. 2, line 62; col. 3, line 1; col. 3, line 30), which would implicitly disclose that the waveguides propagate in single mode, without higher order mode propagation. As to claim 12, Saini discloses that the structure is vertically tapered (col. 2, line 49). Saini further discloses that the waveguides are formed of rib structures (fig. 7A), as mentioned in claim 15. Figure 1D of Saini shows that the layers that make up the EO and passive waveguide have an index relationship, wherein the EO polymer waveguide (n_1) has a higher refractive index than the passive polymer (n_2), as explained in claim 16. With reference to claim 17, Saini shows that the passive polymer waveguide (fig. 10) has a larger mode profile than the EO polymer.

However, the reference does not explicitly state that the EO polymer waveguide and the interconnection waveguides are made up of electrooptic material. On the other hand, Saini discloses that an electrode is disposed along the length of the EO polymer waveguide and the interconnection waveguide (col. 5, lines 35-37). Additionally, Saini

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discloses that the two sections are "active sections" (fig. 7A). One of ordinary skill in the art would know that the waveguides would have to be electrooptic in order for the electrode to affect the properties of the two sections. Therefore, it would have been obvious at the time of invention that the Saini device requires EO material.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saini. Refer to the appropriate drawings or parts of the specification. Saini as applied above, discloses a waveguide structure with a majority of limitations of the claimed invention. However, the reference does not explicitly state the interconnection loss.

On the other hand, it is well known in the art that the loss of optical signal when transferring between waveguides is a negative effect. It is desirable to minimize interconnection loss. One of ordinary skill in the art would have found it obvious to achieve a low interconnection loss, such as 0.4 dB in the device disclosed by Saini.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saini in view of Oh et al "Electrooptic Polymer Modulators Operating in Both TE and TM Modes Incorporating a Vertically Tapered Cladding". Saini as applied above, discloses a waveguide structure with a majority of the limitations of the claimed invention. However, the reference does not explicitly state the angle and the length of the taper.

On the other hand, Oh discloses a similar waveguide structure that teaches the limitations that the Saini reference lacks. Specifically, Oh discloses that the taper length

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is greater than 300um (fig. 3) and the angle of the taper is less than 0.4 degrees (page 1233, col. 1). One of ordinary skill would recognize that the teachings of Oh are combinable with the device of Saini, because the two are from the same field of endeavor. Additionally, Oh discloses that the 0.1-degree angle of the taper is advantageous, because it makes the excess loss negligible (page 1233, col. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to make Saini's waveguide structure such that the taper is greater than 300um and the angle of the taper is less than 0.4 degrees.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saini in view of Ridgway U.S. Patent Application Publication 2003/0059189. Refer to the appropriate drawings or parts of the specification. Saini as applied above, discloses a waveguide structure with a majority of the claimed limitations; however, the reference does not explicitly state that the waveguide comprises a nonlinear chromophore.

On the other hand, Ridgway teaches that it is advantageous to use chromophore in a waveguide, because it enhances electrooptic properties (paragraph 34). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use chromophore in the electrooptic waveguide.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saini. Saini as applied above, discloses a waveguide structure with a majority of the

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limitations; however, the reference does not expressly state that the waveguide is comprised of fluoropolymer.

However, it is well known in the art to use different types of fluoropolymers to fabricate waveguides. Therefore, this limitation would have been obvious to one of ordinary skill in the art at the time of invention.

Allowable Subject Matter

Claims 19 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: As to dependent claim 19, the prior art alone or in combination fails to disclose or render obvious the waveguide structure of claim 18, wherein the nonlinear chromophore includes a tricyanobutadiene acceptor and phenyltetraene. None of the cited prior art teaches or even suggests this limitation.

As to dependent claim 21, the prior art alone or in combination fails to disclose or render obvious the waveguide structure of claim 9, wherein the passive polymer comprises a fluorinated acrylate. Although using fluoropolymers is well known, there would be no reason for one of ordinary skill in the art to find it obvious to use fluorinated acrylate.

Conclusion

The prior art documents submitted by the applicant in the Information Disclosure Statement filed on May 24, 2002, have all been considered and made of record (note attached copy of form PTO-1449).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lee U.S. Patent No. 6,587,609 discloses an optical switching device having a planar waveguide type structure, wherein the structure has a tapered section for coupling.

Oh U.S. Patent No. 6,067,387 discloses electro-optic polymer waveguide device having a taper and a passive waveguide.

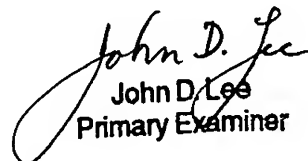
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel E Valencia whose telephone number is (703)-305-4399. The examiner can normally be reached on Monday-Friday 9:30-6:00.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.



DEV



John D. Lee
John D. Lee
Primary Examiner